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Utility Patent Application for an Invention titled

Supplemental Shelf for Vehicle-Mounted Cleaning Systems

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TITLE

Supplemental Shelf for Vehicle-Mounted Cleaning Systems

BACKGROUND

[0001] Several systems exist for cleaning floors and other surfaces in household and commercial settings. These systems range from small self-contained cleaning machines to large, vehicle mounted systems. Vehicle-mounted systems are often used by professionals for several reasons.

[0002] Vehicle-mounted cleaning systems are powerful systems that are capable of cleaning multiple and/or large locations. These systems often include powerful motors designed to aid in the dispensing of cleaning solution and the generating of suction often used to vacuum soiled water. Additionally, vehicle-mounted cleaning systems often include a water management system configured to provide clean water for the cleaning solution and to collect soiled water.

[0003] Moreover, the large motors of vehicle mounted systems allow operators to use these systems at a remote location, allow for more complete removal of the cleaning solution due to the increased suction, and allow for rapid setup and cleaning at various locations during a single outing. Increasing the amount of time spent operating the system increases the operating efficiency for cleaning professionals. Increased efficiency, in turn, leads to increased profitability.

[0004] While vehicle-mounted cleaning systems provide for increased efficiency, they are frequently large and occupy substantial space. As a result, vehicle-mounted cleaning systems occupy most of the space available in the vehicle, thereby limiting the amount of water and/or cleaning solution that may be carried. The amount of water and/or cleaning solution carried by vehicle-mounted cleaning systems directly affects the time the vehicle-mounted system can be used before cleaning must be stopped to retrieve more water and/or cleaning solution.

[0005] A number of vehicle-mounted cleaning systems make use of a molded plastic water storage system. In some of such systems, a shelf is molded into the molded plastic water storage system to store concentrated cleaning solution. The amount of

concentrated cleaning solution stored in the vehicle is often inadequate to fully utilize the clean water storage capacity of the water management system.

SUMMARY

[0006] A supplemental shelf for use in a vehicle-mounted cleaning system includes at least one perimeter member, at least one front mounting member configured to at least partially secured the supplemental shelf with respect to a water management system in a first direction, and at least one rear mounting member configured to cooperate with the front mounting member to at least partially secure the supplemental shelf in a second direction orthogonal to the first direction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The accompanying drawings illustrate various embodiments of the present apparatus and method, and are a part of the specification. The illustrated embodiments are merely examples of the present apparatus and method and do not limit the scope thereof.

[0008] Fig. 1 is a schematic view of a vehicle having a vehicle-mounted cleaning system contained therein.

[0009] Fig. 2A illustrates a top view of a water management system.

[0010] Fig. 2B illustrates a front view of the water management system of Fig. 2A

[0011] Fig. 3 illustrates a perspective view of a supplemental shelf according to one exemplary embodiment.

[0012] Fig. 4 illustrates a front view of a supplemental shelf coupled to a water management system according to one exemplary embodiment.

[0013] Fig. 5 illustrates a top view of the supplemental shelf coupled to the water management system as shown in Fig. 4 according to one exemplary embodiment.

[0014] Throughout the drawings, identical reference numbers designate similar, but not necessarily identical, elements.

DETAILED DESCRIPTION

[0015] A supplemental shelf for use in a vehicle-mounted cleaning system includes at least one perimeter member, at least one front mounting member configured to at least partially secured the supplemental shelf with respect to a water management system in a first direction, and at least one rear mounting member configured to cooperate with the front mounting member to at least partially secure the supplemental shelf in a second direction orthogonal to the first direction.

[0016] As used herein and in the appended claims, the term "water management system" shall be broadly understood to include any device or apparatus capable of storing and/or supplying water for a vehicle-mounted cleaning system.

[0017] In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present method and apparatus. It will be apparent, however, to one skilled in the art that the present method and apparatus may be practiced without these specific details. Reference in the specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. The appearance of the phrase "in one embodiment" in various places in the specification are not necessarily all referring to the same embodiment.

Exemplary Structure

[0018] Fig. 1 illustrates a vehicle (100) in which a vehicle-mounted cleaning system (110) is located. As shown in Fig. 1, a substantial portion of the space associated with the vehicle (100) is occupied by an engine (120) and a passenger compartment (130). Much of the remaining space of the vehicle (100) is occupied by the various components of the cleaning system (110), which generally include a vacuum and motor assembly (140), a hose and reel assembly (150), and a water management system (160).

[0019] The vacuum and motor assembly (140) is coupled to both the hose and reel assembly (150) and to the water management system (160). More specifically, the hose vacuum and motor assembly draws water from a clean water portion of the water management system (160). This water is mixed with cleaning solution concentrate to form a

dilute cleaning solution. Once mixed, the vacuum and motor assembly (140) conveys the dilute cleaning solution to a remote location, where it is used by an operator in a cleaning process. In many instances, the motor assembly (140) also heats the water, to enhance the cleaning effect of the dilute cleaning solution. Moreover, the vacuum and motor assembly also provides suction to an operator to aid in the withdrawing of soiled dilute cleaning solution from the articles to be cleaned.

[0020] For example, in the case of carpet cleaning, a concentrated carpet cleaning solution is mixed with water from the water management system (160) to form a dilute carpet cleaning solution. This solution is sent from the motor assembly (140) through an application hose where it is subsequently applied, at a remote location, to a carpet. The dilute carpet cleaning solution penetrates the carpet and binds with contaminants in the carpet, such as dirt. The soiled dilute carpet solution is then drawn back to the vacuum and motor assembly (140) through a vacuum hose where it is directed to a soiled water collection portion of the water management system (160). As previously discussed, this type of vehicle-mounted cleaning system is often used by professionals for several reasons, including an increased operating times in the field.

[0021] The increased operating time the system is able to operate in the field depends, at least in part, on the amount of fresh water contained in the water management system (160) and on the amount of cleaning solution onboard the vehicle. The more time the system is able to operate in the field without returning to retrieve more water and/or cleaning supplies, the more efficient and hence profitable the cleaning operation becomes.

[0022] The amount of both water and cleaning solution in the vehicle (100) is dependent, at least in part, on the available storage capacity of the vehicle (100). As previously discussed, the passenger compartment (130) occupies a substantial portion of the vehicle. In addition, the individual components of the cleaning system (110) occupy most of the space remaining in the vehicle (100). Moreover, a specified quantity of space is needed to access the various components. This access is indispensable to ensure proper operation of the system, such as to operate controls for the vacuum and motor assembly (130), to fill and refill the water portion of the water management system (160), and to empty the soiled water

storage portion of the water management system (160). Accordingly, usable storage space is at a premium

[0023] Figs. 2A-2B show top and front views of the water management system (160) shown in Fig. 1 in more detail. The water management system (160) is divided into two sections (200, 210). These sections (200, 210) correspond to the fresh water storage portion and the soiled water storage portion discussed above with reference to Fig. 1. Each of these sections is accessible from a fresh water lid (220) and a soiled water lid (230) respectively. The lids (220, 230) are formed in opposing ends of the water management system (160).

[0024] The water management system (160) shown is formed from molded plastic. The water management system (160) also includes a storage shelf (240) formed in the front of the water management system (160) between the lids (220, 230). A plurality of containers or bottles (250) is shown stored in the storage shelf (240). As shown in Fig. 1, a generally horizontal section (260) runs between the lids (220, 230) behind the storage shelf (240).

[0025] As previously discussed, the time an operator or crew is able to remain in the field depends, at least in part, on the amount of water and cleaning solution that the operator or crew is able to carry onboard the vehicle. If the operator or crew exhausts the supply of either of these items, they must either quit for the day or retrieve more supplies and return later.

[0026] The storage shelf (240) formed in the water management system (160) holds a relatively small number of cleaning solution concentrate containers or bottles (250). As a result, the supply of water may be quite large with respect the amount of concentrated cleaning solution onboard. In such cases, the time an operator is in the field is then dictated in large part by the amount of cleaning solution concentrate onboard.

[0027] Fig. 3 illustrates a supplemental cleaning solution concentrate shelf (supplemental shelf) (300). The supplemental shelf (300) may increase onboard storage capacity of the cleaning system (110) by more than two times. The supplemental shelf (300) is configured to be securely coupled to the water management system (160) in such a manner that containers of cleaning solution can be stored therein in an accessible manner while

minimizing the possibility that the containers will be damaged, become dislodged, or be tipped over due to the movement of the vehicle (100; Fig. 1) or other factors. Moreover, the supplemental shelf (300) preserves the specified quantity of space mentioned above that is needed to access the various components of the vehicle (100; Fig. 1).

[0028] The supplemental shelf (300) includes a first perimeter member (310), a second perimeter member (320), a plurality of lateral support members (330), a plurality of front mounting members (340), and a plurality of rear mounting members (350). The lateral support members (330) couple the perimeter members (310, 320) in a spaced apart relationship. The space between the perimeter members (310, 320) allows the perimeter members to securely hold containers therein.

[0029] The supplemental shelf (300) is configured to be securely coupled to and supported by the water management system (160). The distance between the front mounting members (340) and between the front mounting members (340) and the rear mounting members (350) help secure the supplemental shelf (300) against forces in the longitudinal and transverse directions, as referenced with respect to the supplemental shelf (300). These relationships will be discussed in more detail below.

Exemplary Implementation and Operation

[0030] Fig. 4 illustrates a front view of the supplemental shelf (300) coupled to a water management system (160). The first perimeter member (310) spans a substantial portion between the lids (220, 230; Figs. 2A-2B) of the water management system (160) and is configured to rest on the generally horizontal section (260; Figs. 2A-2B). Once the supplemental shelf (300) has been coupled to the water management system (160), containers may be placed therein. The containers are placed through the first and second perimeter members (310, 320). As a result, the containers may rest on the generally planar section (260; Figs. 2A-2B), which supports the weight of the containers. In the implementation shown, the storage shelf (240) is capable of holding four containers (250). The addition of the supplemental shelf (160) more than doubles this capacity, by providing storage for an additional five containers. While the illustrated implementation includes a storage shelf (240) capable of holding four containers (250), the present system and method may be used to

increase the storage capacity of a water management system (160) capable of storing any number of containers. The mounting configuration of the mounting members helps ensure the bottles are securely held, as will be discussed in more detail below.

[0031] The front mounting members (340) help secure the supplemental shelf (300) against longitudinal forces. The front mounting members (340) are separated by a distance that is slightly larger than that of the back of the storage shelf (240). For example, the outside edges of the front mounting members (340) may be separated by a distance of slightly more than approximately thirty inches while the storage shelf may be thirty inches wide. As a result, when the supplemental shelf (300) is coupled to the water management system (160) there is compressive force applied to the front mounting members (340) by the storage shelf (240). This compressive force helps secure the supplemental shelf (300) against forces in the longitudinal direction. According to one exemplary embodiment, friction sleeves (360) can be added to the ends of the front mounting members to further secure the supplemental shelf (300) against longitudinal forces.

[0032] The front mounting members (340) and the rear mounting members (350) cooperate to help secure the supplemental shelf (300) against transverse forces. Fig. 5 illustrates a top view of the supplemental shelf (300) coupled to the water management system. As shown in Fig. 5, when the front mounting members (340) are coupled to the storage shelf (240), the rear mounting members (350) extend over the back of the water management system (160). The front mounting members (340) may be considered to be disposed along a front mounting line and the rear mounting members may be considered to be disposed along a rear mounting line. As shown, these lines are coincident with the back of the storage shelf (240) and the back of the water management system (160). However, the distance between the front mounting members (340) and the rear mounting members (350) is slightly less than the distance between the back of the storage shelf (240) and the back of the water management system (160).

[0033] For example, the distance between lines extended between each of the inside edges of the front mounting member (340) and the rear mounting members (350) may be slightly less than approximately nine and a half inches while the distance between the back of the storage shelf (240) and the back of the water management system (160) is

approximately nine and a half inches. As a result, when the supplemental shelf (300) is coupled to the water management system (160), the supplemental shelf (300) applies a compressive force to the water management system (160). This compressive force helps secure the supplemental shelf (300) against forces in the transverse direction. Friction sleeves can be added to the rear mounting members to further secure the supplemental shelf (300) against transverse forces.

[0034] Accordingly, the supplemental shelf (300) is supported in three-dimensions by resting the containers on the generally planar section (260) and by the interaction between the water management system (160) as determined by the distances between each of the front mounting members (340) with respect to the corners of the storage shelf (240) and the distances between the front mounting members (340) and the rear mounting members (350) with respect to the distance between the back of the storage shelf (240) and the back of the water management system (160).

[0035] The components of the supplemental shelf may be made of any suitable material capable of withstanding the longitudinal, transverse, and vertical loads including, but in no way limited to, metal, plastic, composites, or appropriate mixtures thereof. For example, the perimeter members, the front mounting members, and the rear mounting members may be made of half inch square steel tubing that is bent to shape. The lateral support members (330) may also be made of half inch square steel tubing or they may include portions of eighth inch cold rolled steel (CRS) plate. The entire assembly may be secured together by any suitable means, such as welding or adhesive joining. Further, the entire assembly may be painted, such as by powder coat painting techniques.

Alternative Embodiments

[0036] The implementation shown and described with respect to Figs. 3, 4, and 5 show a supplemental shelf having a plurality of perimeter members. Further, the previously discussed implementations include multiple front and rear mounting members. As shown in Fig. 6 shows a supplement shelf (300-1). The perimeter members (310) may be consolidated into a single perimeter member (310-1), the front mounting members (340) may be

consolidated into a single front mounting member (340-1) and the rear mounting members (350) may be consolidated into a single rear mounting member (350-1).

[0037] In addition, the supplemental shelf may be sized to fit any water management system. The preceding description has been presented only to illustrate and describe the present method and apparatus. It is not intended to be exhaustive or to limit the disclosure to any precise form disclosed. Many modifications and variations are possible in light of the above teaching. It is intended that the scope of the present system and method be defined by the following claims.